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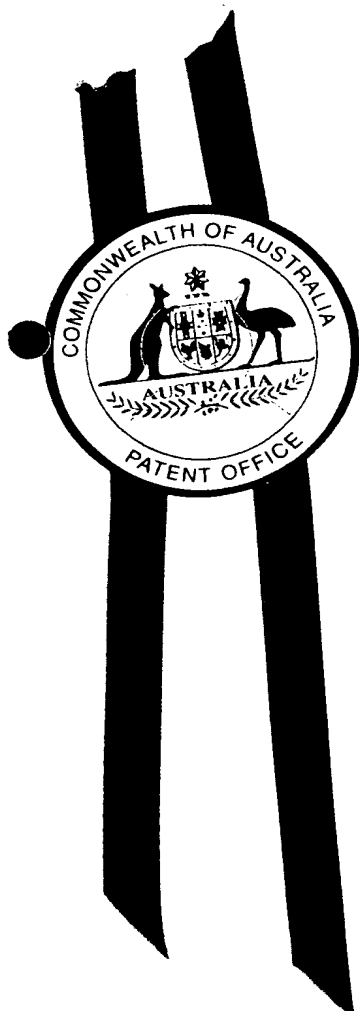
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Patent Office
Canberra

I, KAY WARD, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PP 7390 for a patent by SOLAR ENERGY SYSTEMS PTY LTD filed on 27 November 1998.



WITNESS my hand this
Twenty-fourth day of December 1999

K Ward

KAY WARD
TEAM LEADER EXAMINATION
SUPPORT AND SALES

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Complete Specification Provisional Patent

UNIVERSAL & TALL PUMP DRIVES

Introduction

Mr. Bruno Wittwer designed a double acting poly piston pump using all plastic components. As a pump drive he decided to adapt a "dipper" pump drive similar to the units used in California for pumping oil, the one difference being the pump rod of the double acting poly piston pump had to be pushed down, not only lifted up as is the case with the oil pumps. For this reason, it was necessary for the piston rod to have a stiff connection to the rocker arm which moved in an up and down motion. The rocker arm worked off a pivoting point, and for that reason its fixing point to the piston rod represented a radius on its up and down stroke. This meant the piston rod moved forward and backward with every stroke, meaning the stuffing box wore out very quickly. The piston rod had to be connected through a link to the rocker arm and would bend occasionally, stopping pumping.

For that reason Mr. Wittwer designed two new pumps drives to operate the Poly Piston Pump for bore and transfer pump applications.

Operating Conditions

The universal pump drive is designed so it can be operated manually or as a motorized drive for poly piston pumps. (DC motors driven by solar panels or AC grid powered motors.)

The tall pump drive is designed for motorized applications only, and when used in conjunction with the poly piston pump it is able to pump much larger quantities of water than the universal pump drive.

Both pump drives stand in an upright position directly above the bore hole. All mechanics and motors are located above ground level. Only the poly piston pump is extended down the bore casing and submersed in water. The pump drives can also be installed near any source of water with a transfer pump attached to the drive. It will transfer (shift) water from one point to another, such as from a dam or river to a storage tank or directly into a field.

The "Universal pump drive"

A U channel 100mm x 50mm x 1800mm long provides a ridged base and stands in an upright position. It allows the poly piston pump to be operated in a perfect linear motion. This is achieved with a guiding wheel on the lower end of the crank arm. The wheel is guided with two flat plates welded onto the U channel. Below the plates are two pieces of "Unistrut P3300" welded across the U channel as a fixing point for the poly pump.

On its upper end the crank arm is attached to a crank, which is adjustable to 2", 3" or 4" strokes. The crank arm is long enough not to create too much sideways force which would result in power losses. With two bearings (UC 202-010) fitted back to back on the top end of the U channel, a very strong base is created to hold the main shaft in a horizontal position, with the crank welded onto one end of the shaft. The other end of the shaft has a key-way with a key to hold the pulley, with a handle attached to allow hand operation.

Attached with a hinge to one side of the U channel is a base plate for the electric motor.

The "tall pump drive"

The basics of the tall pump drive are much the same as with the universal pump drive, the obvious difference being a bigger U channel 180mm x 75mm x 2000mm long which provides the ridgid base. It also stands in a upright position, allowing the poly piston pump to be operated in a perfect linear motion. This is achieved with a guiding wheel on the lower end of the crank arm. The wheel is guided with two angle lines welded onto the U channel. Below the plates are two pieces of "Unistrut P3300" welded across the U channel as a fixing point for the poly pump.

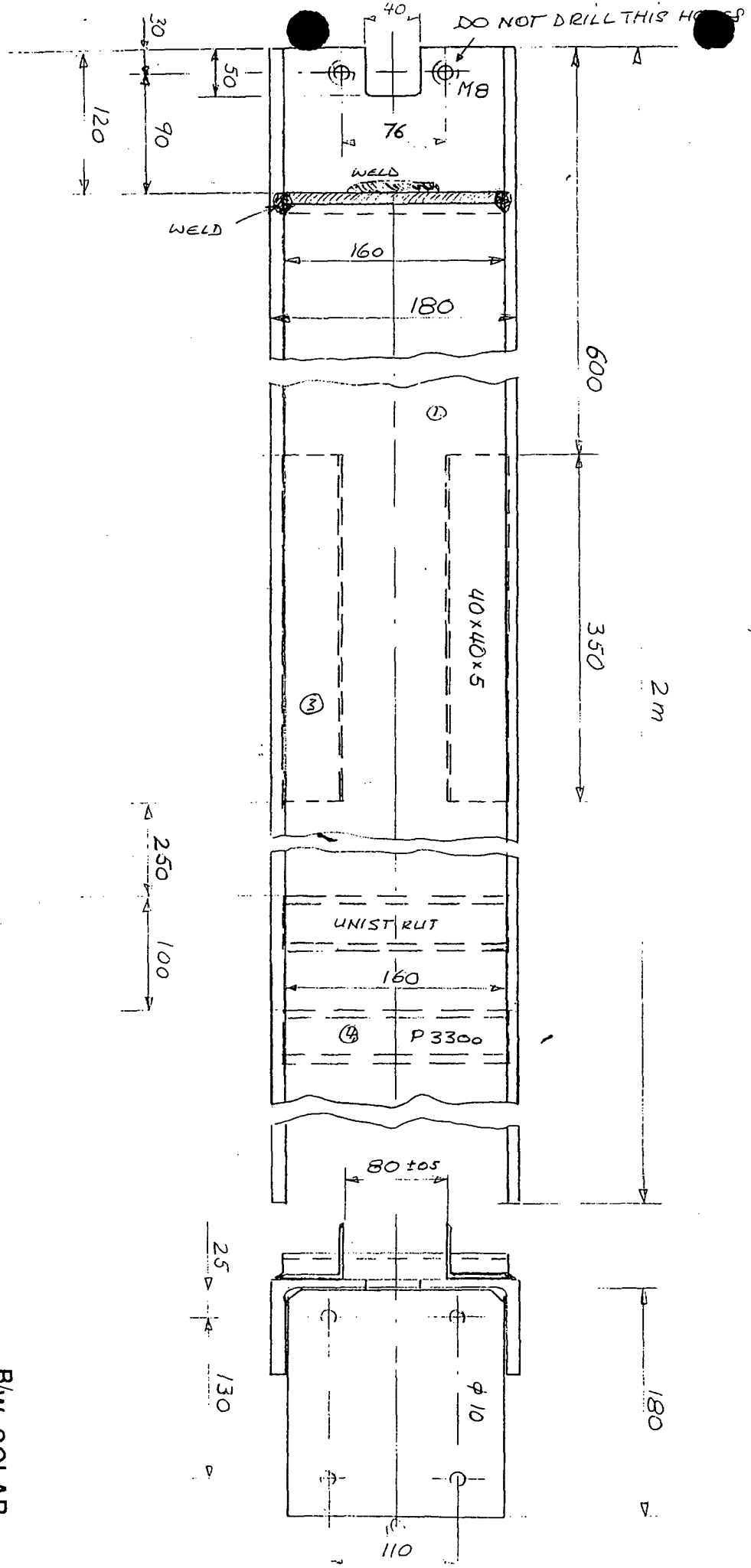
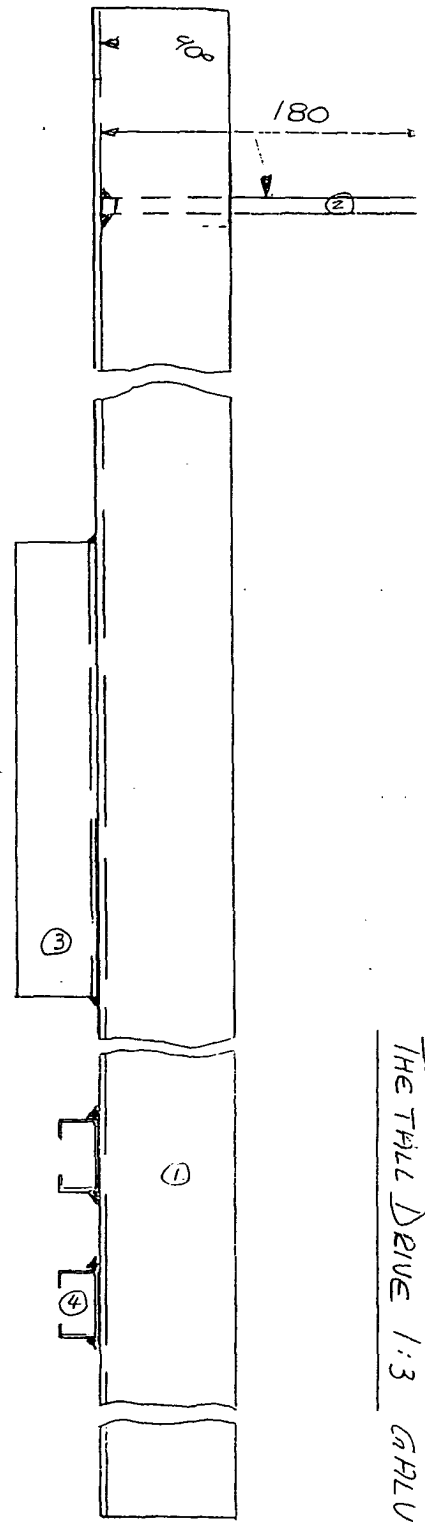
On the upper end the crank arm is attached to a crank bar, adjustable to 4"- 6" - 8" - 10" and 12" strokes. The crank arm is longer again to avoid a sideways action which would result in power losses. A flat plate is welded between the two shanks of the U channel 120mm down from the top end. This plate is

the base for a Gearbox-electric motor combination. The gearboxes' slow shaft points through a cut out in the U channel and the crank bar is fitted directly on to this shaft. In addition, a bearing (AEL 205 W3) is fitted onto the U channel, supporting the slow shaft of the gearbox.

On behalf of Solar Energy Systems Pty Ltd

26th of November 1998

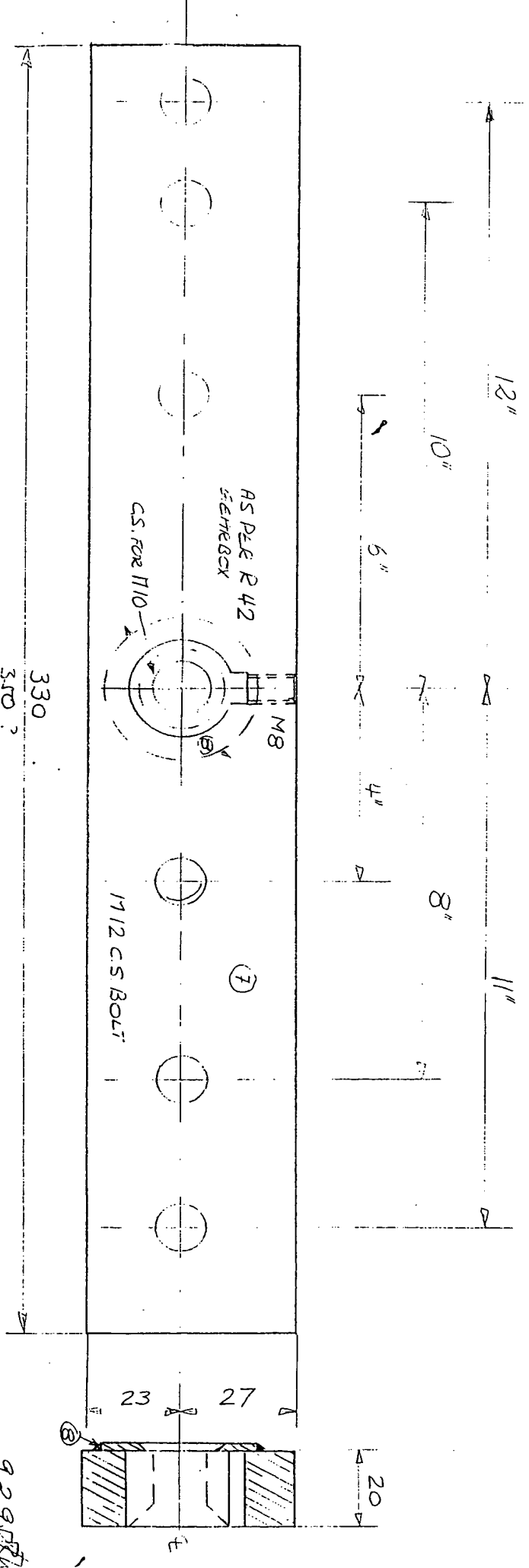
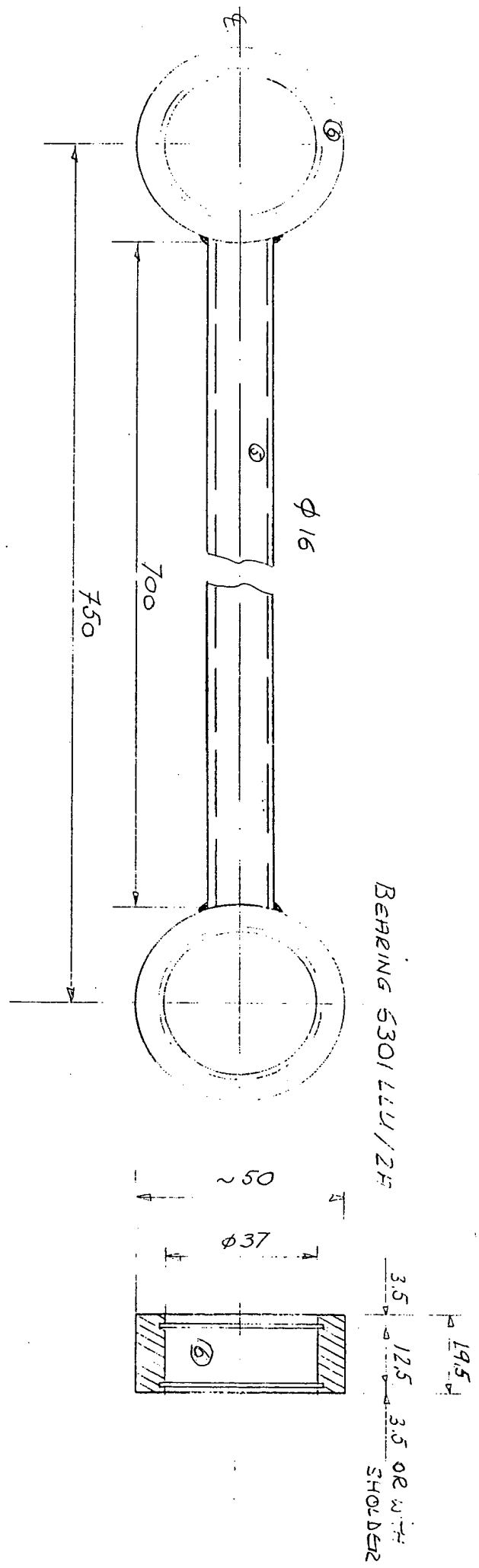
THE TILL DRIVE 1:3 GALVANISED



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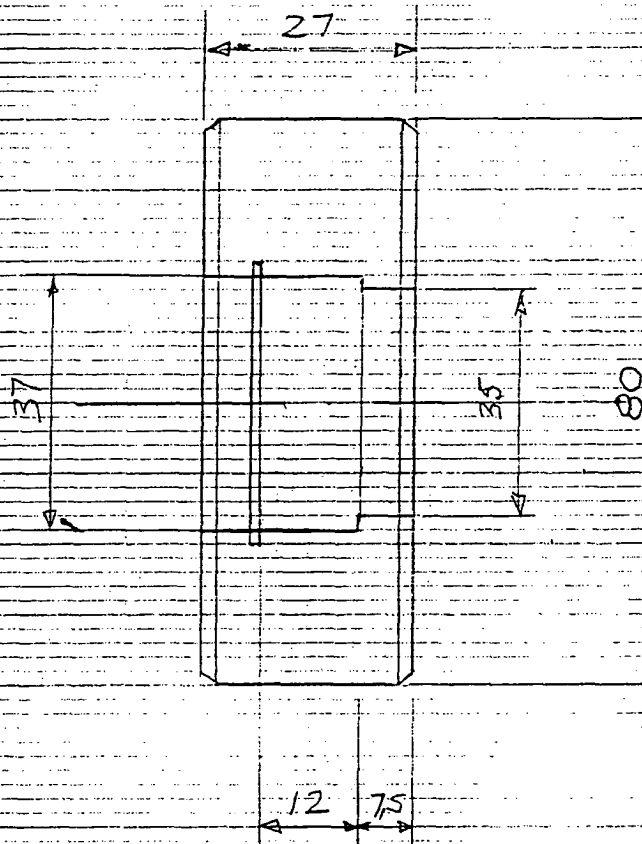
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 829534

Accessories to the Thrill Drive 1:1 (Electroplated)



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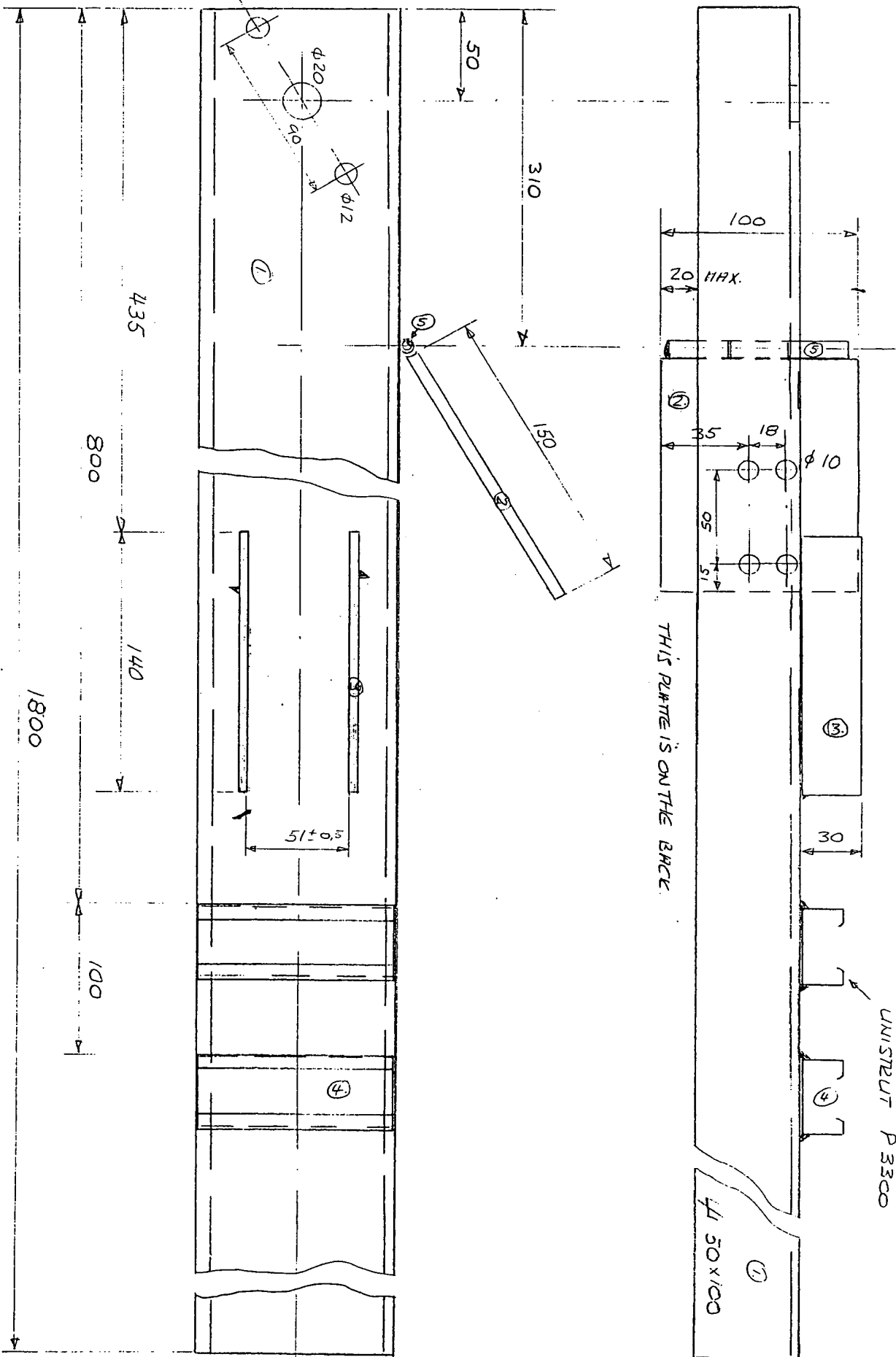
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UNIVERSAL-DRIVE 1:2 (GALVANISED) $\phi 120$ -



THIS PLATE IS ON THE BACK.

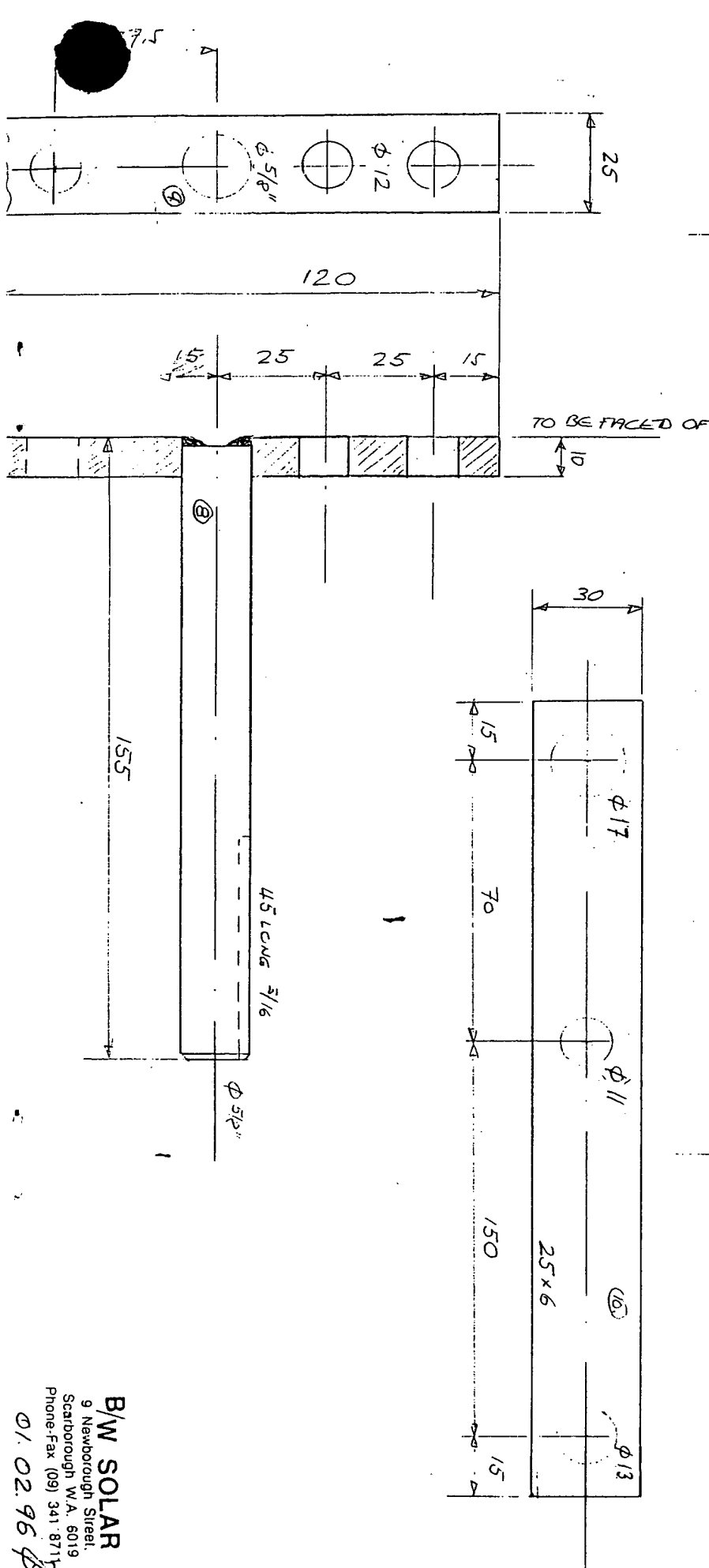
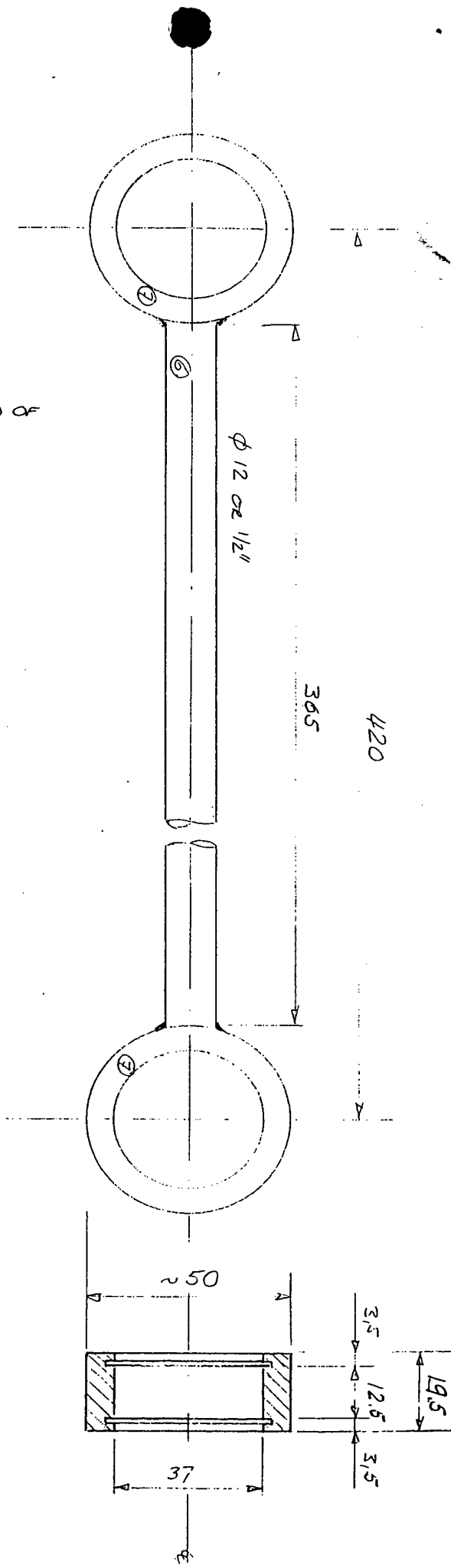
UNISTRUT P3300

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Accessories to Universal Drive Electric Plants, \$ 60.-



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